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Overcoming Fragmentation in the Water Sector to Promote Water Innovation: State-level "Offices of Water Resources Innovation and Development"

Background

Innovation in the water sector is slow and lags well behind that of other sectors with similar profiles, such as the clean energy sector. One of the barriers to development and adoption of new technologies in the water sector is that the industry is highly fragmented. For example, different government entities often manage or regulate water sources depending on whether the source is surface water, groundwater, or stormwater. In general, water supply entities divert, purify, and distribute water to the local population and businesses, while sanitation agencies collect, treat, and dispose of the wastewater. Geographically, approximately 155,000 drinking-water systems and 15,000 wastewater systems exist in the United States (US-EPA 2009), serving diverse communities of various sizes. Many of these systems are small, particularly in rural regions of our nation, and do not have the technical or financial capacity to develop, evaluate, test, or adopt new technologies.

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Fragmented regulation adds another layer of complexity, producing a suboptimal innovation environment and reducing obvious entry points for new innovations. At the Federal level alone eight different agencies are directly or indirectly involved in regulating and managing water, not to mention many statewide and local entities.

Fragmentation in the water sector can hinder the adoption of new and innovative solutions for addressing our 21st century water challenges. It complicates our ability to build a collective vision for our water future. It slows the diffusion of new technologies and innovative solutions to come through the industry. It also can make financing new technologies more difficult. For example, local water suppliers considering the adoption of new recycling, storm water capture, or other technology designed to produce additional water might not be able to tap funds from the larger region even though the region as a whole may benefit from the diversification of its water supply.

One approach to overcoming this fragmentation problem is to establish state-wide offices of water innovation and development, an idea originally examined in the "Path to Water Innovation," a 2014 paper by the Hamilton Project and the Stanford Woods Institute for the Environment. Such Innovation Offices would serve as a coordinating entity within each state and across jurisdictional levels (local, state, and federal). It would develop a vision for the role of technological and managerial innovation in driving sustainable water resource management and promote policies to implement that vision. An overarching role of the office would be to overcome jurisdictional, regulatory and governance fragmentation in order to promote the adoption of innovative solutions.

Creation and Structure

The process for evaluating and creating such an office would vary from state to state depending on each state's existing water governance structure. In many cases, however, the process would involve two steps.

Study of Existing Innovation Obstacles. First, the state legislature or governor would create an independent commission or task force on water innovation, comprising policymakers, academic experts, and major stakeholders. This commission or task force would undertake a series of studies examining various water challenges and opportunities in the state, auditing the overall state of innovation in the water sector, and identifying innovative solutions to address some of the existing challenges.

Creation of a Water Innovation Vision & Plan. Second, the commission or taskforce would draft a water innovation vision and plan for the state. A major component of the innovation plan would be recommendations on how to overcome regulatory fragmentation and establish a regulatory framework that promotes and enables innovation. The plan also could address other obstacles to technological innovation, including financial challenges and pricing policies.

Implementation. Finally, the legislature or governor would create a new innovation office that could work across agencies and geographic scales in implementing the state's innovation vision and plan – or provide for implementation by an existing office or agency.

Function

The state innovation office could have multiple functions. The office's primary responsibility would be to help implement the recommendations of the commission or task force and help promote a regulatory environment that is less fragmented and more supportive of technological innovation. The office also could be tasked with overcoming institutional, sectoral, and financial fragmentation and promoting systematic within-sector and cross-sector coordination on technological advances. More generally, the innovation office, working closely with regulatory bodies at various governmental levels, would be responsible for:

- Collecting and publishing relevant water resources data, essential to effective evaluation of new water technologies;

- Acting as a clearinghouse for all funding sources and identifying and enabling access to nongovernmental funding sources;
- Encouraging and facilitating cooperative funding and development of new technologies among multiple water entities, by, in-part, expanding public–private partnerships;
- Promoting coordination on new technologies among and within sectors (e.g., between water and wastewater agencies, and between water and energy sectors), as well as across all relevant jurisdictional levels (local to state to federal);
- Examining the continuing role of innovation in promoting sustainable water management;
- Coordinating and streamlining laws and regulatory frameworks in order to promote and not hinder technological and managerial innovation; and
- Identifying and promoting best management practices, including appropriate pricing policies, for promoting innovation.

Partnerships and Consortia

The innovation office also could be given the authority to promote the development, testing, and adoption of new technologies. It could work with water suppliers, for example, to develop consortia to jointly fund and conduct the testing of new technologies at scale. Such consortiums could help achieve economies of scale that are often missing in areas where water entities are highly fragmented. The consortiums also could help overcome geographic mismatches in benefits and costs.

One model for these consortia is the Electric Power Research Institute (EPRI). In the aftermath of the large blackout of 1965 (and other noticeable failures of the power sector), the electricity sector knew that it faced tougher regulation by the federal government if it did not act to address collective challenges. The response, in the early 1970s, was the creation of EPRI— now the world's premier collective R&D institution for the power sector. Although EPRI is an industry-led research consortium, it is tightly linked in practice to the regulatory system since regulatory approval for R&D costs and regulatory incentives for adoption are critical.

The innovation office also could have responsibility to disseminate information about the performance and costs of new technologies to other water suppliers, in order to encourage appropriate diffusion of effective technologies. Regional socioeconomic realities and climatological and hydrological variability have created a wide range of issues that require different sets of solutions. Since the challenges that the water sector faces vary dramatically across the country, innovation offices can be customized to handle the specific set of challenges arising in each state. The scope and focus of each innovation office would therefore differ depending on the particular issues facing a state (e.g., water-quality degradation, water scarcity, aging infrastructure, and flooding). A few states in the US have already embraced this idea. A great example is the Water Innovation initiative in the Commonwealth of Massachusetts. Part of the Massachusetts Clean Energy Center (Mass CEC), its goal is to promote water innovation in the state through regulatory reforms, financial incentives, and R&D funding. In May of 2015, the Commonwealth established the Water Innovation Trust, allocating an initial $880,000 for innovative water projects.

Federal Government Role

Not every state may be able to immediately take on the challenge of water innovation through the creation of an innovation office. The largest states with the greatest water challenges—e.g., California, Texas, Florida, or a consortium of like-challenged states such as those in the West—are well-positioned to take the lead. Other states could follow, formulating their offices based on the lessons learned from the first innovation offices. The federal government can play a supportive role in promoting pilot innovation offices, especially for states that lack the expertise or funding to promote innovation on their own. Through the EPA, the federal government could also supply expertise and enable information sharing of best practices among the states. It could reward best practices with race-to-the-top funds and

a periodic innovation report card. It could also engage public utility regulators such as the nonprofit National Association of Regulatory Utility Commissioners (NARUC) to promote adoption of innovation-driving regulations. NARUC could also play a separate but central role in evaluating the performance of innovation offices and disseminating the lessons to other states—just as NARUC does in key areas of electricity and gas regulation.

Conclusions

Across our nation various regions are facing different water challenges. Aging infrastructure, water quality degradation, increasing climate variability, and water scarcity are challenging traditional water resource management solutions and strategies. The water sector has to innovate in order to meet these challenges. However, to date, the innovation landscape in the water sector is not promising.

One of the major hurdles in the development, dissemination, and adoption of innovative solutions is the highly fragmented jurisdictional and regulatory setting. For the water sector to become more efficient and innovative in the water it manages, it has to address the myriad jurisdictional and regulatory fragmentation problems it faces.

A major step would be the establishment of offices of innovation at state levels in order to: 1) create a water vision for each state, 2) coordinate and streamline laws and regulatory frameworks within each state and across jurisdictional levels (federal, and local) and sectors (e.g. water-energy), 3) act as clearinghouses for public and private funding sources, and 4) promote the development, testing, and adoption of new technologies. Through such efforts, the office could gradually reduce institutional, sectoral, and financial disintegration; promote systematic within-sector and cross-sector coordination on technological and managerial advances; and ultimately advance the adoption of critical new innovations in both technology and management.

This Research Brief is based on "The Path to Water Innovation," by Newsha K. Ajami, Barton H. Thompson Jr., and David G. Victor, a discussion paper presented in October 2014 at "New Directions in U.S. Water Policy," a conference hosted by The Hamilton Project and Stanford Woods Institute for the Environment.

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